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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,112	06/12/2002	Kuang-Yeh Chang	NAUP0488USA	9182
27765	7590	10/03/2003		
NAIPO (NORTH AMERICA INTERNATIONAL PATENT OFFICE) P.O. BOX 506 MERRIFIELD, VA 22116			EXAMINER AHMED, SHAMIM	
			ART UNIT 1765	PAPER NUMBER 2
DATE MAILED: 10/03/2003				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/064,112

Applicant(s)

CHANG, KUANG-YEH

Examiner

Shamim Ahmed

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 June 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claims 12, 25 and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claims 12, recites the limitation "the spec" in lines 2- 3. There is insufficient antecedent basis for this limitation in the claim because "the spec" never mentioned to the previous claims upon which claim 12 depends on.

As to claims 25 and 42, similar analysis applies as the discussion for claim 12 above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Fang et al (5,935,868) as evidenced by Kelkar (6,291,367).

As to claims 1-5,18-19 Applicant's admitted prior art disclose a lithography process and a re-work process of forming a pattern layout during the formation of a

shallow trench isolation on the surface of a silicon substrate (61) having a deposition layer of silicon dioxide (62) (see paragraph 06 at page 2).

Applicant's admitted prior art also discloses that a patterned photoresist layer (64) is formed over the substrate and performing an inspection process in order to ensure the correctness of the patterned photoresist layer (see the paragraph 09 at page 3).

Applicant's admitted prior art fails to teach the introduction of a protective layer on a surface of the silicon substrate.

However, in a method of making interconnect structure, Fang et al teach that a protective layer of dielectric layer (309) of silicon oxide is formed on a surface of a deposition layer (307) on the silicon substrate for protecting the underlying deposition layer from the subsequent process such as plasma ashing process for removal the patterned photoresist layer (col.5, lines 1-4 and lines 10-25).

Therefore, it would have been obvious to one skilled in the art at the time of claimed invention to combine Fang et al's teaching into the Applicant's admitted prior art for protecting the underlying dielectric layer from subsequent process such as removal of the photoresist in order to achieve a defect-free via as taught by Fang et al.

As to claims 6 and 20, Applicant's admitted prior art teaches the layout pattern could be a contact plug or a dual damascene structure (see paragraph 07).

As to claims 7 and 21, Applicant's admitted prior art teaches that an anti-reflection coating (66) is disposed underneath the bottom of the patterned photoresist layer (see paragraph 08, lines 1-3 and figure 1).

As to claims 8-9, 22 and 37, Fang et al teach that the thickness of the protective dielectric layer (309) is approximately 50 angstroms to 3000 (col.4, lines 48-52).

As to claims 10,23 and 38, modified Applicant's admitted prior art teaches that the protective layer of silicon oxide is formed by using CVD or any conventional technique (col.5, lines 7-9), which includes low pressure CVD or PECVD as evidenced by Kelkar (6,291,367).

Kelkar teaches that a common CVD includes low pressure chemical vapor deposition (LPCVD) and plasma enhanced chemical vapor deposition (PECVD) in order to deposit dielectric layer (see col.1, lines 18-29).

As to claims 11,24, Applicant's admitted prior art teaches that the first inspection process is an after develop inspection (ADI) for screening the correctness of the patterned photoresist layer (see paragraph 09 and figure 2).

As to claims 12, and 25, Applicant's admitted prior art teaches that if the inspected correctness is in the desired specification, a normal process is performed and if not, a re-work process is performed (see paragraph 09 and figure 2).

As to claim 13, Applicant's admitted prior art teaches that the normal process is one of an etching process or an ion implantation process (see paragraph 09, last line).

As to claims 14,16-17 and 26-30, 40 and 42, modified Applicant's admitted prior art teaches that the rework process includes plasma ashing process (step 36); a wet cleaning process; rinsing and drying process (step 38); performing a second inspection process (step 40); reforming the patterned photoresist layer on the surface of the

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protective layer and finally performing a third inspection process of ADI process for a second time (see paragraphs 10-13 in Applicant's admitted prior art).

As to claims 15, 27 and 41, modified Applicant's admitted prior art teaches that a fluorine based solvent can be used in the wet cleaning process (last three lines of the paragraph 10).

As to claims 31-34, see the discussion for rejection of claims 2-5 above.

As to claim 35, see the discussion for rejection of claims 6 and 20 above.

As to claim 36, see the discussion for rejection of claims 7 and 21 above.

As to claim 39, see the discussion for rejection of claim 13 above.

As to claim 41, see the discussion for rejection of claims 15 and 27 above.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Huang (6,150,073) discloses a degradation free patterning for damascene structure using a protective dielectric layer (212) on a silicon surface (col.3, lines 6-33)..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (703) 305-2667. The fax phone

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number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Shamim Ahmed
Examiner
Art Unit 1765

SA
September 22, 2003